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CONTENTS OF No. 120.

	PAGE
Patience and Courage for the Truth. By Herbert Spencer	93
Ghosts and Goblins. By Richard A. Proctor	94
The Morality of Happiness. By Thomas Foster	95
The Universe of Suns. (*Illus.*) By R. A. Proctor	96
Tricycles in 1884. By J. Browning	97
Wild Bees. By S. A. Butler	99
Jupiter in a Three-inch Telescope. (*Illus.*) By F.R.A.S.	101
To Readers	102
The Face of the Sky	103
Correspondence: Mr. Ruskin on Modern Storm-Clouds — Red Glare—Tame Unconfined Robins, &c.	104
Our Whist Column	105
Our Chess Column	106

PATIENCE AND COURAGE FOR THE TRUTH.*

BY HERBERT SPENCER.

THE spirit of toleration which is so marked a characteristic of modern times, and is daily growing more conspicuous, has a far deeper meaning than is supposed. What we commonly regard simply as a due respect for the right of private judgment, is really a necessary condition to the balancing of the progressive and conservative tendencies—is a means of maintaining the adaptation between men's beliefs and their natures. It is therefore a spirit to be fostered; and it is a spirit which the catholic thinker, who perceives the functions of these various conflicting creeds, should above all other men display.

To this end let him ever bear in mind three cardinal facts.

The first is the existence of a fundamental verity—under *all* forms of religion, however degraded. In each of them there is a soul of truth. Through the gross body of dogmas, traditions, and rites which contain it, it is always visible—dimly or clearly as the case may be. This it is which gives vitality even to the rudest creed; this it is which survives every modification; and this it is which we must not forget when condemning the forms under which it is presented.

The second of these cardinal facts is that while these concrete elements in which each creed embodies this soul of truth, are bad as measured by an absolute standard, they are good as measured by a relative standard. Though from higher perceptions they hide the abstract verity within them; yet to lower perceptions they render this verity more appreciable than it would otherwise be. They serve to make real and influential over men, that which would else be unreal and uninfluential. Or we may call them the protective envelopes without which the contained truth would die.

The remaining cardinal fact is that these various beliefs are parts of the constituted order of things; and not accidental but necessary parts. Seeing how one or other of them is everywhere present; is of perennial growth; and when cut down redevelops in a form but slightly modified, we cannot avoid the inference that they are needful accompaniments of human life, severally fitted to the societies in which they are indigenous. From the highest point of view we must recognise them as elements in that great evolution of which the beginning and end are beyond our knowledge and conception—as modes of manifestation of the Unknowable; and as having this for their warrant.

Our toleration should therefore be the widest possible. Or rather we should aim at something beyond toleration, as commonly understood. In dealing with alien beliefs, our endeavour must be, not simply to refrain from injustice of word or deed, but also to do justice by an open recognition of positive worth. We must qualify our disagreement with as much as may be of sympathy.

But, although existing religious ideas and institutions have an average adaptation to the characters of the people who live under them; yet as these characters are ever changing the adaptation is ever becoming imperfect; and the ideas and institutions need remodelling with a frequency proportionate to the rapidity of the change. Hence, while it is requisite that free play should be given to conservative thought and action, progressive thought and action must also have free play. Without the agency of both there cannot be those continual re-adaptions which orderly progress requires.

Whoever hesitates to utter that which he thinks the highest truth, lest it should be too much in advance of the time, may reassure himself by looking at his acts from an impersonal point of view. Let him duly realise the fact that opinion is the agency through which character adapts external arrangements to itself—that his opinion rightly forms part of this agency—is a unit of force, constituting with other such units the general power which works out social changes; and he will perceive that be may properly give full utterance to his innermost conviction; leaving it to produce what effect it may. It is not for nothing that he has in him these sympathies with some principles and repugnance to others. He, with all his capacities and aspirations and beliefs, is not an accident, but a product of the time. He must remember that while he is a descendant of the past, he is a parent of the future; and that his thoughts are as children born to him, which he may not carelessly let die. He, like every other man, may properly consider himself as one of the myriad agencies through whom works the Unknown Cause, and when the Unknown Cause produces in him a certain belief, he is thereby authorised to profess and act out that belief. For, to render in their highest sense the words of the poet:—

> Nature is made better by no mean,
> But nature makes that mean: over that art
> Which you say adds to nature, is an art
> That nature makes.

Not as adventitious, therefore, will the wise man regard the faith which is in him. The lightest truth he sees he will fearlessly utter;* knowing that, let what may come of it, he is thus playing his right part in the world—knowing that if he can effect the change he aims at—well: if not—well also; though not *so* well.

* From "First Principles," Part I.

* How admirably the poet philosopher of America presents the spirit of as fearless inquiry which leads to the recognition of new aspects of eternal truths,—

This should be, he says, our

> —— homage to the mightier powers,
> To ask our boldest question, undismayed
> By muttered threats that some hysteric sense
> Of wrong or insult will convulse the throne
> Where Wisdom reigns supreme.

Far back in the days of old we see the same reverent daring in the grand utterances of the Book of Job,—I say *reverent* daring, for here *doubt*, not daring, means irreverence, even as the tremors of a suppliant for justice are an insult to the righteous judge.—R. P.

GHOSTS AND GOBLINS.

By Richard A. Proctor.

ANOTHER circumstance which seems to have considerable effect in preparing the mind to entertain superstitious emotions is intense or long-continued brooding on sorrows, and especially on the loss of one dear to us. Mingled with our thoughts at such times, the idea is always more or less consciously entertained that our lately-lost friend is near to us and knows our thoughts. The reason may be convinced

> No spirit ever brake the band
> That stays him from his native land,
> Where first he walk'd when clasp't in clay:

while nevertheless something within us teaches (wrongly or rightly, who knows?) that the spirit itself

> May come
> When all the nerve of sense is numb,
> Spirit to spirit, ghost to ghost.

Surely it is not the weak and ignorant alone who have this experience. The mind of strongest mould need not be ashamed to have entertained the thought, to have even prayed the prayer,—

> Descend, and touch, and enter; hear
> The wish, too strong for words to name,
> That in this blindness of the frame
> My Ghost may feel that thine is near.

Under the influence of emotions such as these the mind is prepared to be deceived. It is at such times that visions of the departed have been seen. I do not here speak of visions called up out of nothing—the healthy mind cannot be so far betrayed—but of visions none the less imaginary. The mind has no creative power to *form* such visions, except when there is diseased and abnormal action; but it possesses a power to combine real objects so as to form pictures of the unreal, and this power is singularly active in the time of sorrowing for a near and dear friend.

It is probable that the experience of every reader of these lines will supply instances in point. Sometimes the deception of the mind is singularly complete, insomuch that it is only by the determination to approach the seeming vision that the ghost-seer is able to remove the impression. I will cite an instance which occurred to myself, as somewhat aptly illustrating the principal circumstances tending to make such illusions effective:—

My mother died during the long vacation of my first year at Cambridge. It chanced that I was in Germany at the time, and I suffered much distress of mind from the thought that I had been enjoying a pleasure-tour during the days of her last illness. Letters had followed me from place to place, but it was only the circumstance of my staying my journey one Sunday at Heidelberg which enabled me to receive news from England; and I only reached home in time to attend her funeral. Yet the full effect of these circumstances was only experienced when I found myself again settled in my rooms at Cambridge. There is a singular mixture of society and solitude in university life, which at times of trouble produces unpleasant feelings. Throughout the day there is abundant opportunity for intercourse with friends; but although amongst one's college friends are some who will be friends for life, yet at the time the interchange of ideas even with these special friends relates almost wholly to college work or college interests. There is nothing homelike in social arrangements at college. So soon as the "oak is sported" for the evening a lonely feeling is apt to come on, which affects even some of those who have no recent sorrows to brood over. There is a refuge in hard reading. But hard reading, in my case, had come to an end on my mother's death. I had so far accustomed myself to associate college successes with the idea of pleasure given to her that I now looked with aversion on my former studies. They could no longer gain the prize I had alone cared for. I ought, no doubt, to have had quite other feelings, but I speak of the effects I actually experienced. Now, whether the breaking up of my old plans for work had upset me, or in whatever way it happened, I certainly had never found college life so lonely and unpleasant as during the first term of my second year. And it seems to me likely that the low spirits from which I then suffered may have had something to do with the singular instance of self-deception I have now to relate:—

I had on one evening been particularly, I may say unreasonably, low-spirited. I had sat brooding for hours over dismal thoughts. These thoughts had followed me to bed, and I went to sleep still under their influence. I cannot remember my dreams—I did dream, and my dreams were melancholy—but although I had a perfectly clear remembrance of their tenour on first waking,* they had passed altogether from my recollection the next morning. It is to be noted, however, that I was under the influence of sorrowful dreams when I awoke. At this time the light of a waning moon was shining into the room. I opened my eyes, and saw, without surprise or any conscious feeling of fear,—my mother standing at the foot of the bed. She was not "in her habit as she lived," but "clothed in white samite, mystic, wonderful." Her face was pale, though not with the pallor of life; her expression sorrowful, and tears which glistened in the moonlight stood in her eyes. And now a strange mental condition followed. My reason told me that I was deceived by appearances; that the figure I saw was neither my mother's spirit nor an unreal vision. I felt certain I was not looking at "a phantom of the brain which would show itself without"; and I felt equally certain that no really existent spirit was there before me. Yet the longer I looked, the more perfect appeared the picture. I racked my memory to recall any objects in my bedroom which could be mistaken for a shrouded ghost; but my memory was busy recalling the features of the dead, and my brain (against the action of my will) was tracing these features in the figure which stood before me. The deception grew more and more complete until I could have spoken aloud as to a living person. Meantime, my mind had suggested, and at once rejected, the idea of a trick played me by one of my college friends. I felt a perfect assurance that whatever it was which stood before me, it was not a breathing creature self-restrained into absolute stillness. How long I remained gazing at the

* One of the most singular facts connected with the condition of the brain during and directly after sleep, is this, that although on waking one may recollect every circumstance of a dream, and even go carefully over the events of the dream with the express object of impressing them on the mind, yet if one sleeps again the whole seems, on our next waking, to have vanished completely from the memory. One can barely remember the circumstance that there had been the desire to retain the recollection of the dream. I doubt even whether this is not generally forgotten; so that in fact in most cases there is nothing to recall either the dream or the first waking thoughts concerning it. There is a story of a person who solved a mathematical problem in his sleep, and found the solution written out on his desk, yet had no recollection of having left his bed for the purpose. Something similar once occurred to myself; but I could just recall the circumstance that I had got up to put on paper the ideas which had occurred to me in sleep. I wish I could make the story complete by saying the solution was singularly ingenious, and so on; but truth compels me to admit that it was utter rubbish. I could not have been in the full possession of my faculties—though seemingly wide awake—when I wrote it out as something worth remembering.

figure I cannot remember; but I know that I continued steadfastly looking at it until I had assured myself that (to my mind in its probably unhealthy condition) the picture was perfect in all respects. At last I raised my head from the pillow, intending to draw nearer to the mysterious figure. But it was quite unnecessary. I had not raised my head three inches before the ghost was gone, and in its place,—or rather, not in its place, but five or six feet farther away, *hung my college surplice.* It was quite impossible to restore the illusion by resuming my former position. The mind which a moment before had been so completely deceived, rejected completely the idea of resemblance. There was nothing even in the arrangement of the folds of the surplice to justify in the slightest degree an illusion which, neverthless, had been perfect while it lasted. Only one feature of the apparition was accounted for. I have said that the eyes shone with tears: the explanation was rather commonplace; over my surplice I had hung a rowing belt, and the silvered buckles (partly concealed by the folds of the surplice) shone in the moonlight.

The event here narrated suggests the explanation of many ghost stories which have been related with perfect good faith. I believe the imagination only acts so as to deceive the mind completely when the latter has been painfully affected and is in an unhealthy condition. When this is the case, and a vision of some departed friend is conjured up out of realities indistinctly seen, the effect on the mind will depend greatly on the ideas entertained by the victim of the illusion on the subject of ghosts and visions generally. A believer in ghosts will be too startled to inquire further. If (as happens in many instances of the kind) he can retreat from the dread presence, he will commonly do so, and remain satisfied ever after that *he* at least has "seen a ghost." And in this way, I doubt little, many veracious persons have been led to give their evidence in favour of the common notions about ghosts and visions.

It is a singular circumstance, however, that sometimes several persons may be deceived by an illusion such as I have been considering. There is an instance of this kind in a book on the supernatural which I read many years ago. I cannot at the moment recall the name. It dealt with all forms of mental deception, mesmerism, witchcraft, necromancing, and so on. In the part relating to visions, it cited the case of Sir Walter Scott, who soon after the death of Byron, and while his mind was dwelling on the painful circumstances of that event, saw in the dusk of a large room a vision of the poet which presently *resolved itself into furniture.* Then came the case I have in my thoughts. As nearly as I can remember, the story ran thus:—A gentleman who had lately lost his wife, looking out of window in the dusk of evening, saw her sitting in a garden chair. He called one of his daughters and asked her to look out into the garden. "Why," she said, "mother is sitting there." Another daughter was called, and she experienced the same illusion. Then the gentleman went out into the garden, and found that a garden-dress of his wife's had been placed over the seat in such a position as to produce the illusion which had deceived himself and his daughters.

I know of a more curious instance, where no explanation was ever obtained, simply because the deceived persons were too frightened to seek for one. In a house in Ireland a girl lay dying. Her mother and father were with her; and her five sisters were praying for her in a neighbouring room. This room was well lit, but overhead there was a skylight and the dark sky beyond. One of the sisters looking up towards the skylight, saw there the face of her dying sister looking sorrowfully down upon them. She seized another sister by the hand and pointed to the skylight: and one after another the sisters looked where she pointed. They spoke no word; and in a few moments their father and mother called them to the room where their sister had just died; but when afterwards they talked together about what had happened that night, it was found that *they had all seen the vision of the sorrowful face.*

A remarkable circumstance in these and many other instances of supposed visions, is the utterly unreasonable nature of the supposition actually made in the mind of the ghost-seer. In the stories where a ghost appears for some useful purpose, as to show where treasure has been concealed or to reveal the misdeeds of some person still living, the mind does not reject the event as altogether unreasonable though the circumstances may be (and commonly are) sufficiently preposterous. But one can conceive no reason whatever why a departed wife and mother should make her appearance in a garden-chair on a dusky evening, and still less why the vision of a dying sister should look down through a skylight. It is singular that on this account alone the mind does not reject the illusion in such cases.

(*To be continued.*)

THE MORALITY OF HAPPINESS.

By Thomas Foster.

CARE FOR SELF AS A DUTY.

(*Continued from page 70.*)

THE thought seems strange to many that in conduct which appears to them mere care of self there may be farther-seeing regard for others than in simple self-sacrifice. Yet the matter is so obvious when pointed out as to suggest later a different sort of retort,—namely that it was scarce worth pointing out. Only as it happens that this truly obvious matter has been grievously overlooked, as the teacher of this essentially true and therefore demonstrable lesson has been rebuked for inculcating mere self-seeking, it is tolerably clear that the lesson was very much needed.

Let us consider how obviously true it is, however, as he presents it. Take for instance the matter on which I touched in my last,—viz., the consideration of the known laws of heredity. "When we remember," says the clear calm teacher of our time, "how commonly it is remarked that high health and overflowing spirits render any lot in life tolerable, while chronic ailments make gloomy a life most favourably circumstanced, it becomes amazing that both the world at large and writers who make conduct their study, should ignore the terrible evils which disregard of personal well-being inflicts on the unborn, and the incalculable good laid up for the unborn by attention to personal well-being. Of all bequests of parents to children the most valuable is a sound constitution. Though a man's body is not a property that can be inherited, yet his constitution may fitly be compared to an entailed estate; and if he rightly understands his duty to posterity, he will see that he is bound to pass on that estate uninjured if not improved. To say this is to say that he must be egoistic to the extent of satisfying all those desires associated with the due performance of functions. Nay, it is to say more. It is to say that he must seek in due amounts the various pleasures which life offers. For beyond the effect these have in raising the tide of life and maintaining constitutional vigour, there is the effect they

have in preserving and increasing a capacity for receiving enjoyment. Endowed with abundant energies and various tastes, some can get gratifications of many kinds on opportunities hourly occurring; while others are so inert, and so uninterested in things around, that they cannot even take the trouble to amuse themselves. And unless heredity be denied, the inference must be that due acceptance of the miscellaneous pleasures life offers, conduces to the capacity for enjoyment in posterity; and that persistence in dull monotonous life by parents diminishes the ability of their descendants to make the best of what gratifications fall to them."

All this is clear and obvious enough when thus pointed out; though the very passage in which Mr. Spencer here so clearly shows that to be happy so far as by due regard of personal well-being one can make oneself happy, is a duty, has been selected for abuse as though he taught simply this—seek to gratify self in every available way. The kind of rebuke justly passed on those who in the search for pleasure, in mere self-gratification, ruin their health, lose happiness, become morose, gloomy, and misanthropic, lose taste for all pleasures lower as well as higher, and hand on to their children and their children's children these and other evil effects of the grosser forms of self-indulgence, has been passed upon the teacher of that far-seeing care of self by which the health is preserved, happiness obtained, the whole nature strengthened and sweetened, the enjoyment of all forms of pleasure increased, and in all these respects the lot of posterity improved to many—nay, to uncounted generations.

On the other hand, there are those who, seeing that the doctrine taught is unassailable on that side, assert that it is and always has been obvious,—forgetting how many morose and gloomy people there are who show by their mere existence that in the past (of which they are the descendants) the contrary doctrine has prevailed, as it still exists in the present (which they in part represent), and will continue doubtless for many generations.

If it be agreed that Mr. Spencer's teaching in this matter is needless where it is accepted and useless where it is needed (because none who would be benefited by it will listen), I answer that the case is otherwise. There are thousands now and their number will be largely increased in the future, who have found in this teaching the lesson which they needed to make their lives happy and their influence in their own time and in the future blessed. It has come as a new and cheering light to them (I was going to say as a revelation, but the word would be misinterpreted) to see in happiness, their own included, the answer to the doleful question, Is life worth living? If by self-mortification, overwork, wear and worry, I make myself wretched and fail to make those around me happier, I may well ask in mournful accents that foolish question. If I not only fail so to make others happier but make them less happy, and hand on gloom and misery to future ages, I may not only ask it gloomily but answer it sadly, Life is *not* worth living. Better, were it lawful, to cease the painful and useless, the worse than useless, contest. But if by due care and thought of self, by reasonable enjoyment of the bright and pleasant things which life brings to most, I in some degree or wholly counterpoise such pains and sorrows as life brings to all, and at the same time help to brighten the lives of those around, and those also of generations as yet unborn, how shall I doubt what answer to give to the question, Is Life worth Living? Not sad is the answer, but bright and cheering.

There is still not a little to be said respecting the due care of personal well-being. Just here I close by remarking that in the attempt to simplify Mr. Herbert Spencer's nomenclature, I certainly did not improve the title of this chapter by calling it "Self *versus* Others" as I did till now, instead of "Egoism *versus* Altruism," as he called the chapter in the "Data of Ethics" bearing on the same subject. Due care of self is not a matter of "Self *versus* Others," seeing that care of personal well-being is essential to the influence of self for the good of others. I have therefore given to this section a new sub-title.

(*To be continued.*)

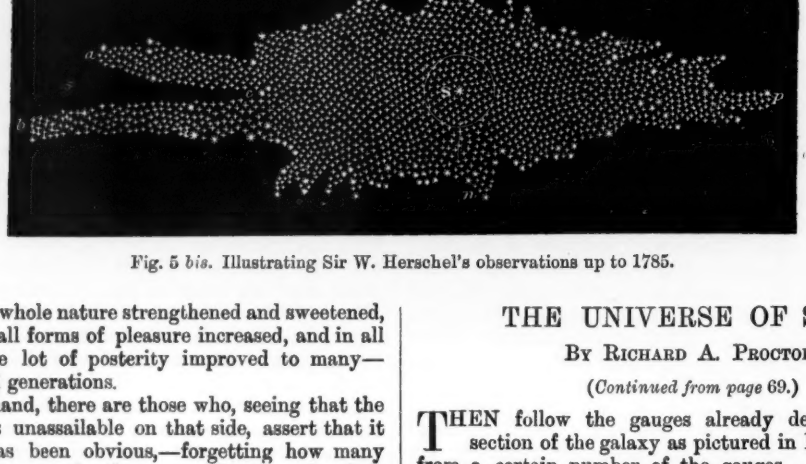


Fig. 5 *bis.* Illustrating Sir W. Herschel's observations up to 1785.

THE UNIVERSE OF SUNS.

By Richard A. Proctor.

(*Continued from page* 69.)

THEN follow the gauges already described, and the section of the galaxy as pictured in Fig. 5, is deduced from a certain number of the gauges. On the scale on which Fig. 5 is drawn the sphere enclosing all the stars visible to the unaided eye was considered by Herschel to have probably no greater extent than the small circle around S. It will also be remembered that this is only a section of our sidereal scheme according to Herschel's views in 1785. But it is now also to be particularly noticed that Herschel even at this time, by no means regarded the stellar system thus figured in section, as composed of stars spread with a general uniformity throughout the space occupied by the system. He fully recognised the fact *that our own star-system is made up of clusters and nebulæ*, with relatively vacant spaces between, as well as many isolated stars. He describes the star-system of the theory, not as of that relatively-simple form which has been almost invariably assigned to it since, in our text-books of astronomy,* but as "*a very extensive, branching,*

* The star system has been so described even by Sir John Herschel. It may seem perplexing that though he had many oppor-

compound congeries of many millions of stars; which most probably owes its origin to many remarkably large as well as pretty closely scattered small stars that may have drawn together the rest."

Let the reader carefully study the following extract, and he will find that whereas it is perplexing in the extreme if the sidereal system be regarded as a mere cloven stratum of stars, pretty uniformly distributed, it becomes perfectly clear (and wonderfully striking) when we remember that Sir W. Herschel considered the Milky Way to be compound in structure and branching in figure.

"If it were possible," says Herschel, "to distinguish between the parts of an indefinitely extended whole, the nebula we inhabit might be said to be one that has fewer marks of profound antiquity upon it than the rest. To explain this idea, perhaps, more clearly, we should recollect that the condensation of clusters of stars has been ascribed to a gradual approach, and whoever reflects upon the numbers of ages that must have past before some of the clusters could be so far condensed as we find them at present, will not wonder if I ascribe a certain air of youth and vigour to many very regularly scattered regions of our sidereal stratum." "There are moreover many places in the stratum where there is the greatest reason to believe that the stars, if we may judge from appearances, are now drawing towards various secondary centres, and will in time separate into different clusters, so as to occasion many sub-divisions. Hence we may surmise that when a nebulous stratum consists chiefly of nebulæ of the first and second form, it probably owes its origin to what may be called the decay of a great compound nebula of the third form; and that the subdivisions which happen to it in the length of time, occasioned all the small nebulæ which spring from it to lie in a certain range, according as they were detached from the primary one. In like manner our system, after numbers of ages, may very possibly become divided so as to give rise to a stratum of two or three hundred nebulæ; for it would not be difficult to point out so many beginning or gathering clusters in it. This view of the subject throws a considerable light upon the appearance of that remarkable collection of many hundreds of nebulæ which are to be seen in what I have called the nebulous stratum of Coma Berenices. It appears from the extended and branching figure of our nebula, that there is room for the decomposed small nebulæ of a large, reduced, former great one to approach nearer to us in the sides than in other parts. Nay possibly there might originally be another very large joining branch, which in time became separated by the condensation of the stars; and this may be the reason of the little remaining breadth of our system in that very place; for the nebulæ of the stratum of Coma are brightest and most crowded just opposite our situation, or in the pole of our system. As soon as this idea was suggested I tried also the opposite pole, where accordingly I have met with a great number of nebulæ though under a much more scattered form."

It will thus appear that even at this early stage of his researches Sir W. Herschel was so far from regarding all the nebulæ and clusters as external Milky Ways, that he felt free to broach the striking theory that the vast groups and clusters of nebulæ seen in certain regions of the heavens are decayed (or at least ancient) branches of our own star-system.

In the following passage he even more clearly indicates his belief that nebulæ and clusters may be formed in progress of time from portions of the Galaxy:—

"Some parts of our system seem indeed," he says, "to have already suffered greater ravages of time than others, if this way of expressing myself may be allowed. For instance, in the body of the Scorpion is an opening, or hole, which is probably owing to this cause." He describes the opening—a place where close by rich galactic fields he found none but a few scattered and pretty large stars. Then he proceeds: "This opening is at least four degrees broad; but its height I have not yet ascertained. It is remarkable that the nebula 80 Messier, which is one of the richest and most compressed clusters of small stars I remember to have seen, is situated just on the western border of it; which would almost authorise a suspicion that the stars of which it is composed were collected from that place, and had left the vacancy. What adds not a little to this surmise is, that the same phenomenon is once more repeated with the cluster of stars 4 Messier, which is also on the western border of another vacancy, and has moreover a small miniature cluster, or easily resolvable nebulæ, following it at no very great distance."

In fact Sir W. Herschel clearly distinguishes from among the rest those nebulæ which he regards as Milky Ways like our own. He mentions that "there are some very remarkable nebulæ which cannot well be less but are probably much larger than our system; and being also extended, the inhabitants of the planets that attend the stars which compose these nebulæ must likewise perceive the same phenomena. For which reason these nebulæ may also be called Milky Ways by way of distinction." He limits this term to those nebulæ which are of considerable apparent extent, but shine either wholly or in part with a milky light not resolvable into stars even in his most powerful telescope.

(To be continued).

tunities of conversing with his father upon this and kindred subjects, Sir John Herschel should to any extent misapprehend the meaning of Sir W. Herschel's papers. I would point out, however, that we have no evidence whatever tending to show that the view of 1785, and the progress of the elder Herschel's theorising from that date until the year 1818 (when his last paper appeared) were the subject of discussion or conversation between the elder and younger Herschel,—or were likely to be so. I fancy Sir W. Herschel talked little about his theories within his family circle. I cannot recall a single instance in which Sir J. Herschel has written, "I remember that my father used to say" so-and-so respecting the universe. In his "Outlines of Astronomy," as well as in the "Observations at the South Cape," Sir John Herschel invariably refers to his father's published statements. I might also refer to passages in letters of his to myself, in which he seems to imply that his knowledge of his father's theories came from a study of Sir W. Herschel's papers. I would venture indeed to express my belief,—which may, however, be a mistaken one,—that Sir John Herschel had not studied any portion of his father's work save only that relating to the double stars, during his father's lifetime. It is known that his undertaking to continue the labours commenced by his father, was prompted by filial piety, his own tastes tending rather to chemical and mathematical research.

TRICYCLES IN 1884.

By John Browning,

Chairman of the London Tricycle Club.

LEST any of my readers should suppose that the experiences I have given in my last article on "Trying Tricycles" are matters of everyday occurrence, I should wish to point out that they are the only unfortunate events that have happened to me during the last three years in trying dozens of tricycles, that none of them have been with machines which I have recommended in my articles, and that the machines themselves might fittingly be considered as a series of "frightful examples" only to be known to be avoided. It would be well, however, to recollect that a

tyro should not choose a machine for himself without advice, nor, if he has chosen one, should he ride it on the first occasion without the assistance of an experienced rider—if he can possibly get it.

As I have, during the last month, had the opportunity of pretty severely testing several novel machines, some of my readers may probably be glad to have some information about them at as early a date as possible, as they may be contemplating a purchase.

My first trial was made of the "Traveller, No. 2" (I wish the makers, Messrs. Singer & Co., would give this excellent machine a distinctive name). Although, if the "Humber" had not been born before it, the "Traveller" would probably never have seen daylight, yet the "Traveller, No. 2," has a character quite peculiar to itself. Its special feature is that it is a triple-steerer—that is, the three wheels all move together in such a way that the somewhat erratic steering of the "Humber" is completely overcome, while the steering is completely under control either with the hands or the feet.

At first starting with the machine down-hill I came very nearly in for an accident, and I finished with a closer shave still. Both arose from the same cause. When the machine is running with the three wheels in a line parallel to the backbone, it answers the helm with great facility; but when the three wheels are all inclined to the right—in which case the machine will, of course, travel to the right—and you wish to change the course, there is an appreciable resistance to your steering it in the opposite direction. Possibly this arises from the grip or bite of the three wheels on the ground, all of which must be moved together before a change in the direction can be effected. If so, it is a good quality once it is fully understood and taken fairly into consideration.

Just after starting I had to steer close to the near side to keep clear of a horse coming up the hill in the middle of the road. Just below was a horse and cart standing on the near side facing me. Before steering back into the middle of the road again to avoid them, I found myself in front of the horse, and only saved myself from running full face into him by back pedalling and applying my brake as hard as I dared, for as it was I lifted my hind wheel off the ground. I had done too much in the way of steering, but I did not make the same mistake again throughout the day.

On returning, as I was riding up a short, stiff hill, the surface of which was loose and rough, I heard a heavy horse, with an empty cart, trotting up behind me. As I could tell it was gaining on me, I attempted to steer out of its path, and at the same time spurted to get out of its way. The resistance to the change in the direction of the steering was so great that, although the machine is a double driver, both the wheels skidded, and I found myself with my cranks on dead centres and helpless. The incline was so steep that my brake would not hold it, so that I was compelled to dismount hurriedly from the pedal as best I could, with the near wheel of the cart almost touching my off wheel.

This shave was my own fault again, as the machine should not have been turned or allowed to turn when riding up a steep hill.

Had it been driven up in a straight line, I feel sure it would have gone up without skidding, as I have ridden the hill many times easily on inferior machines.

It must be remembered that a novice would not have attempted to ride this machine as I did on the first occasion, and so would have avoided the risks I ran.

"The Traveller, No. 2," is a *front and rear-steerer*, by means of bicycle-handles. The first day I took it out was a most trying one. There had been a sharp frost in the night and a rapid thaw in the morning, and the roads were rotten, and a good part of the way I had to struggle against a strong head-wind. I never knew a machine go better under such unfavourable conditions. It is a good hill-climber, and perfectly safe down hill with the slightest attention. I do not consider it against the machine that at the outset it requires learning. A writer in a recent number of the *Tricycling Journal* very justly said that if a man buys a piano, he expects to have to learn to play it. If he buys a horse, he knows he will have to learn to ride it; but, strangely enough, every person supposes he can ride a tricycle without learning.

The "Coventry Rotary" has been generally admitted to be the best machine made for nice steering. This is due to its being a double-steerer. I do not see why the triple-steering "Traveller" should not equal or even eclipse it, though it will require some practice on the part of the rider to bring out its best qualities in this respect. The violin is the acknowledged king of musical instruments, but one would scarcely suppose this to be so if they heard it for the first time in the hands of an uninstructed performer.

I promised my readers to say more respecting the new rear-steerer, the "Rover," when I had been able to test it more severely. Having now ridden it almost daily for nearly a fortnight, I am able to report confidently that it is a first-rate machine. It is about 10 lb. heavier than it need be, but it would be difficult for the most critical rider to find any other fault with it. It is an excellent hill-climber, fast and easy on the level, and fairly safe down hill. I have not, owing to the time of year, been able to find any hills in sufficiently good condition to run down at a great velocity, but I have run down several at the rate of more than ten miles an hour without the machine swerving or showing any tendency to oscillate.

The brake of the "Rover" is by far the most perfect brake I have ever used. While it is powerful enough to stop the machine in a few feet, it will not stop it dead, so that there is no risk of throwing yourself out in front with it, and if you wish to you can bring up in ascending the steepest hill it is possible to ride, with the certainty that the brake will hold you. Scarcely any other brake will do this. As a rule brakes will not check a machine efficiently when it is running backwards.

The "Rover" is one of the handiest machines to mount and dismount from, and the handiest to handle when you are dismounted.

It is also a first-rate luggage-carrier. If it should prove slightly unsteady downhill when travelling at a great pace, I should advise the makers to make the steering-wheel larger, say 20 in. in diameter. This alteration I have been advocating for years past, particularly in rear-steering machines.

I may say that when testing the "Rover" downhill I had my seat so far forward that I was actually in advance of my pedals, and my handles were underneath and almost behind me; yet I was unable to detect the slightest tendency on the part of the hind wheel to leave the ground.

The best form of the "Rover" would be the machine weighing not more than 75 lb., with 40-in. driving-wheels, geared up to from 46 to 50 in., according to the strength of the rider; or with a good two-speed gear (Bown's would be worth trying), geared for power to 35 and for speed to 55 in. I am obliged to Mr. Leni for bringing this capital machine before my notice so early in the season.

The following rough rule may be useful as a guide to the adoption of gearing. If a standard machine, with, say, 44-in. wheels, geared level, weighs 90 lb., then for every

10 lb. the machine can be reduced in weight, a weak man may gear-up 2 in. extra, a man of average strength 2½ in. extra, and a very powerful rider 3 in. extra with advantage; while if a two-speed gearing be used, a weak man may increase his high speed still further by 6 in., a man of average strength by 8 in., and a very powerful rider by 10 in. This would give a first-class rider, on a machine weighing only 60 lb., a high speed of 63 in., about the utmost he could possibly use with advantage, even for racing on good roads.

About a year or eighteen months ago, I had an opportunity of riding the Centre-Cycle on a level flooring. A public company is now being formed to bring out this machine. Last Saturday I was very kindly invited to test the machine again at the Crystal Palace.

The "Centre-Cycle," which was invented by Mr. Burstow, of Horsham, is of very novel and ingenious construction. It consists of one large wheel, like a bicycle wheel, on which the rider sits astride, and four small wheels at the corners of a long, low platform, of which the bicycle wheel occupies the centre.

The steering is effected by means of bicycle handles, which bring two of the small wheels to incline in opposite directions, and lower the machine, and incline the large wheel on the side towards which the machine has to be turned. The four small wheels can be lifted off the ground at the will of the rider, and feats that would shame a bicycle-trick rider, such as going over two bricks standing on their ends, can be performed upon it easily and gracefully.

But the machine appears to me to possess faults which are incurable. It is unstable, having a very much smaller wheel base than any tricycle; it is difficult and fatiguing to mount and dismount from, and, worst of all, *it is only a single driver*, that is, only one wheel out of the five can be driven. This is a great disadvantage. For the single large wheel of the machine would skid, and the rider, however strong and skilful, would be brought to a standstill in many places where a worse rider on a good double-driving tricycle would travel well. Possibly when carrying heavy weights the purpose for which it is now being put forward, the grip of the single driving-wheel might be increased, and the stability would certainly be greatly increased by carrying a large amount of weight well below the centre of gravity of the machine, but even for carrying purposes I should greatly prefer Singer's "Carrier" or Starley and Sutton's "Despatch."

WILD BEES.

By S. A. Butler, B.A., B.Sc.

(Continued from page 54.)

THE next business is to provide a store of food sufficient for the support of the young during the whole period of its growth, that is, throughout its larval existence; for as the grub is completely destitute of limbs, it is utterly unable to go forth into the world to seek its own living, and, therefore, if no provision were made for it, starvation would immediately ensue. The careful mother, however, relaxes not her efforts till she has provided against such a calamity; an excellent manager is she; for though she has hitherto had no experience in providing for the wants of bee-grubs (unless, indeed, she has some recollection of the days of her own larvadom, and remembers the store laid up for her by her own mother), she knows exactly the amount of food that will be needed by each one of her expected offspring, and provides for each the requisite amount, even before it is born. The food consists principally of the pollen of flowers, that golden dust with which the central organs of flowers are so abundantly supplied; this she collects from the flowers, and passing it from hand to hand, packs it up amongst the pubescence of her hind legs, or underneath her abdomen, and so conveys it home. Here it is mixed with a little honey and made up into a ball, in many cases about the size of a garden pea. One of these pellets is placed at the end of each burrow, and then a single egg is deposited upon each, after which the burrows are closed up, and when all the stock of eggs has been deposited, the mother's work is ended. Though she has lived only through one season, she is now in the decrepitude of old age. She can look back with calm satisfaction at the successful accomplishment of her important work, and can, therefore, philosophically compose her mind to her rapidly-approaching demise. The eggs are small, some very minute, and are usually slightly curved and tapering at one end. Left to themselves, they soon hatch; a wormlike, footless grub issues from the shell, and begins a vigorous attack upon the store of rich and most nutritious food provided for its sustenance. Its sole object now is to eat, and its persistent efforts in this direction receive their due reward in a growth so rapid as very speedily to bring it to the close of its larval existence, and at the same time to the end of its appointed store of nutriment. This sensuous life over, if the time of year be suitable, the creature becomes transformed into the chrysalis or pupa. This is at first semi-transparent, and through the skin can be seen the gradually-developing body of the bee, with its wings, legs, and antennæ devoutly pressed lengthwise along its breast. On reaching perfect maturity it bursts through its shroud, casts aside its grave-clothes, and crawls forth, a feeble, tottering thing, to the light of day.

Warm sunshine and fresh breezes soon raise its drooping spirits, and it spreads its wings and, for the first time in its life, leaves the sordid earth, and soars away, rejoicing in the beauty of its newly-acquired garb, and exulting in the possession of faculties far superior to those with which it has hitherto been endowed. And now commences the serious business of its life—that which all its previous stages have had in view, and for which they have been preparatory — the perpetuation of its kind. Soon mated, and almost equally soon widowed, the female bee devotes herself most assiduously to those labours I have already referred to as preceding the deposition of the eggs, and thus the whole cycle is again passed through.

Such is the general outline of the life-history of the majority of our wild bees. But there are some kinds which are structurally incapacitated for the life of unremitting toil that forms so conspicuous a characteristic of the industrious bees. The so-called Cuckoo-bees are quite unprovided with the pubescence necessary for the collection of pollen, and, consequently, totally unable to obtain by their own personal exertions the sustenance needful for their young. But still the maternal instinct is strong within them, and they cannot quit life till their helpless young have been, in some way or other, provided for. They adopt, therefore, the only resource left to them; they watch for the burrow of some industrious bee, and as soon as they see that it has been furnished with a supply of pollen, they dart in during a temporary absence of the rightful owner and deposit an egg on the mass. From this habit, which is paralleled by the cuckoo amongst birds, they have received the name of Cuckoo Bees. They are frequently very brilliantly coloured, their bodies being banded and

striped something like that of a wasp (Fig. 4), and they are not necessarily at all like the bees on which they are parasitic. Each species of Cuckoo Bee usually confines its visits to the nests of one particular species of industrious

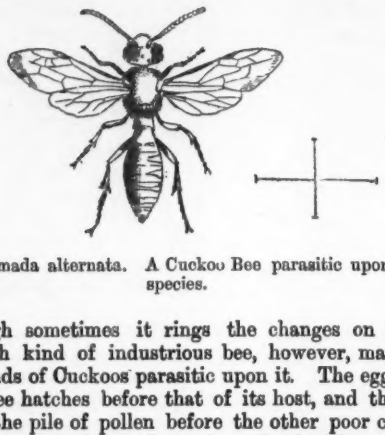


Fig. 4.—Nomada alternata. A Cuckoo Bee parasitic upon several species.

bee, though sometimes it rings the changes on two or three; each kind of industrious bee, however, may have several kinds of Cuckoos parasitic upon it. The egg of the Cuckoo Bee hatches before that of its host, and the larva consumes the pile of pollen before the other poor creature is able to prevent it, so that when the legitimate owner awakes to consciousness he finds his larder empty and himself a ruined being, with no alternative but starvation.

This is not the only way in which the careful exertions of the industrious mother on behalf of her offspring are liable to be frustrated. There is a most brilliantly-coloured hymenopterous insect, with bright red body and green head and thorax, which may often be seen lurking about in the neighbourhood of the burrows of bees. It is no very distant relation of the bees themselves, but it is their

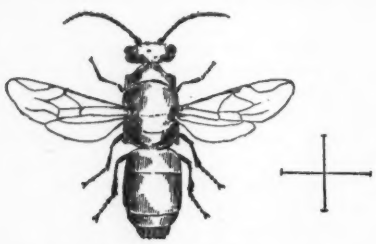


Fig. 5.—Chrysis neglecta. Firetail.

inveterate foe. It is called the Ruby-tailed Fly, Firetail, or Golden Wasp (Fig. 5). Unlike the Cuckoo Bees, its grubs are carnivorous, and attack, not the store of food laid up by the industrious bees, but the larvæ themselves. The young grub of the Firetail seizes the much larger grub of the bee, and appears, at first, to suck out some of its juices, thereby gradually rendering the poor creature flaccid and feeble. After these sucking operations have gone on some time, and there is not much vitality left in the poor victim, though the destroyer has flourished grandly on the juices abstracted, the latter proceeds to complete the filling out of its own bulk by adding the solid parts, as it has previously the fluid of its victim, to its own body, and so the hapless bee-grub is devoured, and scarcely a fragment is left behind.

Not only are the nests of bees liable to the invasion of parasites, but their very bodies are not exempt from attack. There is a most curious little insect which is nourished within the bodies of many bees; so quaint a being is it that much debate has taken place as to its systematic position in the animal kingdom, and its relationship to other insects. By some naturalists it is considered to be an outlying member of the great order of beetles, but by others it is regarded as of so curious a type as not to fit well into any of the ordinary groups of insects, but to necessitate the formation of a division exclusively its own. The creature is named *Stylops;* the male is a little, black, impish-looking thing, with milky-white wings (Fig. 6), but the female is a worm-like creature without wings, and never leaves the body of its host.

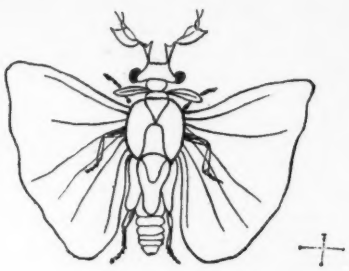


Fig. 6.—Male Stylops.

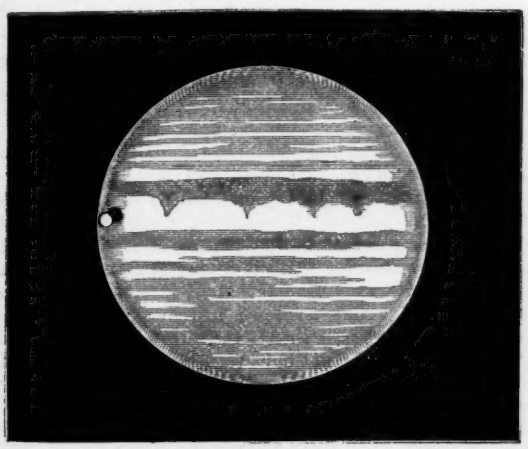
These curious little insects were discovered by Mr. Kirby, well-known as one of the earliest of the historians of our British bees. Seeing a small protuberance on the body of a bee, he endeavoured to remove it with a pin, supposing it to be a mite of some kind, such creatures being often found on bees. Instead of a mite, however, he drew forth from the bee's body a whitish grub, about ¼ in. long, the head of which had formed the protuberance observed. Surprised and interested he made further search with a result which is best told in his own words: "After I had examined one specimen, I attempted to extract a second, and the reader may imagine how greatly my astonishment was increased, when, after I had drawn it out but a little way, I saw its skin burst, and a head as black as ink, with large staring eyes, and antennæ consisting of two branches, break forth and move itself briskly from side to side. It looked like a little imp of darkness just emerged from the infernal regions. I was impatient to become better acquainted with so singular a creature. When it was completely disengaged and I had secured it from making its escape, I set myself to examine it as closely as possible; and I found, after a careful inquiry, that I had not only got a nondescript, but also an insect of a new genus, whose very order seemed dubious." It is possible to breed these little creatures from the bodies of the bees they frequent. The following directions were given by the late Mr. F. Smith, the zealous Hymenopterist of the British Museum:—Place a bee which contains in its body a female Stylops, and is, therefore, said to be stylopised, in a box 5 in. or 6 in. square, and covered at the top with gauze; supply the bee daily with fresh flowers, such as it is accustomed to visit; in a few days she will probably appear as though her abdomen were covered with dust; this dust, on microscopical investigation, turns out to be a vast number of minute creatures, the larvæ of the Stylops, which have been hatched within their parent's body. If a bee, covered in this way with the larvæ of the Stylops, should happen to settle on a flower, many of the tiny creatures may perhaps be deposited; if another bee then visit the flower, they may be able to attach themselves to its body by clinging to its pubescence, and so get carried to its nest, where they will attack the bee-larvæ, boring into their bodies.

(To be continued.)

JUPITER IN A THREE-INCH TELESCOPE.

By a Fellow of the Royal Astronomical Society.

THERE is assuredly no member of the planetary system which offers so diversified a series of phenomena to the contemplation of the student, as the noble one which we propose to examine to-night. Exceeding the earth in volume between thirteen and fourteen hundred times, and reflecting (as has been calculated) some sixty-three out of every hundred parts of the sun's light that falls upon him, Jupiter exhibits a disc and shines with a lustre which renders him a conspicuous object in the smallest telescope. Now, it might be supposed, from the brightness of the planet, that a high magnifying power would be most applicable to his examination; as a matter of fact and practice, however, it is found that he will not bear so much amplification, with advantage, as his much duller neighbour, Saturn. Moreover, all the curious detail of which we are immediately about to speak is much better seen when a slight haze overspreads the sky and softens the glare of light on Jupiter's disc, which, in itself, forms an impediment to the perception of very delicate markings. Happily for us, such a haze does cover part of the sky on the night which we have selected for our drawing. Wishing to use as much magnifying power as we can without impairing definition, we, as a limit, fix on 50 to each inch of aperture of our telescope. Arming it then with a power of 150, we turn it on to the planet, to behold the spectacle, of which the subjoined engraving gives a pretty accurate idea.



Jupiter. Jan. 24, 1884, 9h. 5m. p.m. Power 150.

The first thing that will probably arrest the attention of the young observer is the shape of the planet. Instead of presenting a circular disc it will be seen to be very notably elliptical; in other words, flattened at the poles, and bulging out at the equator. And next, as the eye gets accustomed to the image, a series of belts of different depths of shading, and even of markedly different colours, will be seen, striping Jupiter's face in a direction parallel to his equator. Let us take those visible when our drawing was made. We will begin at the top of the planet, which, as all astronomical telescopes invert, is, of course, its south pole. For some little distance the tint is pretty uniform—or as an artist would say, "flat;" but then it is seen to consist of a series of stripings; the lighter divisions between them being well marked and easily visible as we approach the northern edge of this polar capping. Then comes a distinct white streak, bounded on the north by the principal belt in Jupiter's disc. This is the most conspicuous feature on the whole face of the planet. It is of a decidedly brownish tint, and its northern edge shows a marked tendency to throw out small projections, so as to give a kind of "scalloped" effect. With a larger instrument the dark matter of this belt is seen to emit prolongations or streamers of a wispy character from these projections, diagonally across the broad bright equatorial interval; but what we have drawn above shows everything that it is within the power of a three-inch telescope to reveal. The northern and fainter of the two equatorial dark belts is in its turn succeeded by yet another white streak; that by a fainter dark one still, while a multiplicity of stripes covers the north pole of the planet with a shading which, like the south polar capping, looks practically "flat" or homogeneous. A little attention will show that the east and west "limbs" (or edges) of the disc are not quite so bright as its central parts, and that a slight fading away of the belts is perceptible as they approach the limb. The satellite and its shadow visible on the left hand, western, (or "preceding") limb of the planet will be dealt with by and bye. It must not, however, be supposed that the markings we have described are constant or permanent, like the oceans, seas, continents, and islands of our own earth; or that a map of Jupiter constructed from observations now would be of much use in, say, 1886. Moreover, confining ourselves to a single night's observation, the details on the surface of the planet will be seen to undergo a very marked change in the course of four or five hours' persistent watching of them, for the simple reason that Jupiter is rotating on his axis at a speed so tremendous as to be beyond our power of realisation. The notable markings which appear from time to time upon his face give obvious indications of proper motions or driftings of their own, and this complicates and renders uncertain the exact determination of the period of the planet's rotation. It would, however, seem that he turns on his axis in a period not differing greatly from 9h. 56m., so that a spot on his equator must travel at the rate of over seven miles a second! A simple plumb-line must form an effective transit instrument in such a favoured locality! Well then, by his mere rotation fresh features are brought into view; but after the lapse of nine or ten hours we shall revert to that aspect of the planet which it presented when we commenced our watch. These changes, therefore, are simply such as arise from viewing in succession the markings extending over the whole of Jupiter's spheroidal surface—of which, of course, only one-half is visible at any one given instant. We have now to speak of the much more remarkable changes which occur in the markings themselves in the course of months or years. As a familiar example, we may refer to the wonderful great, oval, red spot which appeared on the face of the planet to the south of the southern one of his equatorial belts in the year 1879, and which persisted in a perfectly visible form up to last year; although it has now vanished, save in large and powerful telescopes, in which it has been perceived as the very ghost of its former self. It may be seen in the curiously "smudgy" little caricature of Jupiter in p. 221, Vol. I. of Knowledge. In August, 1878, a great circular white spot formed a most conspicuous object on the planet's equator, and in the succeeding year one enormous dark belt, covering Jupiter's equatorial regions, was broken up, or perforated, as it were, with similar but more irregularly-shaped white markings. In 1880, a sinuous continuous white marking separated the equatorial belt into two—the red spot at this time appearing of a pale scarlet tint. In

1881, the red spot persisting, the belts became much narrower, and the "vandyking" or "scalloping" of the northern edge of a dark one south of the Equator was even more marked than the similar phenomenon in the somewhat corresponding dark streak shown in our sketch above. And so we might go on detailing a series of most curious changes which have occurred during the last five-and-twenty years; but for the fact that our object in these papers is the practical one of teaching the student exactly what to look for, rather than merely the giving a list of other people's observations. With one concluding remark, then, on the phenomena of Jupiter's disc proper, we will pass to the consideration of those of his satellites. It is this. Jupiter is much too far off to exhibit phases; but he does show an indication of doing so, when (what is technically called) in quadrature, or when he is 90° east or west of the sun, as measured along the ecliptic. Under these circumstances the limb farthest from the sun exhibits a perceptible shading, much too deep to be confused with the slight fading away of light all round the limb which is always visible.

(To be continued.)

Shooting Stars.—Perhaps, there is no instance in the whole history of astronomy in which so marked a change of view has had to be recorded as in the case of shooting-stars. If we take up an old treatise on astronomy, and by an old work we mean simply such an one as might have been in use a generation ago, we shall find no mention made at all of falling or shooting-stars. These objects were not recognised, in fact, as astronomical, save by a few advanced inquirers. To learn anything about meteors from the works in use thirty or forty years ago we must turn, not to astronomical, but to meteorological treatises. In these, among electric phenomena, or among such appearances as Will-o'-the-Wisps or Jack-o'-Lanterns, we find falling-stars more or less lucidly dealt with. We are told that they are generated (in some way not explained) in the upper regions of air, and being thence attracted by affinity, or in some other conveniently unintelligible way, descend with more or less rapidity to the earth according to the state of the atmospheric electricity. It is pleasing to turn from these vague and unsatisfactory notions to the results which have rewarded modern scientific research into the nature of these interesting bodies.

Conversion of Light into Electricity.—The conversion of electricity into light is now a fact of every-day utility, but the reverse process has been very slow of accomplishment. It has, however, been effected by Herr Sauer, whose sunlight battery has been described in the *Electrotechnische Zeitschrift*. The chemical rays furnish the power, and the battery will only act in sunlight. It consists of a glass vessel, containing a solution of fifteen parts of table salt and seven parts of sulphate of copper, in 106 parts of water. In this is placed a porous cell containing mercury. One electrode is made of platinum, and the other of sulphide of silver, and both are connected with a galvanometer. When not in use the whole is enclosed in a box. When in use the platinum electrode is immersed in the mercury, and the other in the salt solution; the battery is placed in the sunlight, and the galvanometer needle is then found to be deflected, the sulphide of silver being the negative pole. If the sun is clouded, or any other change in the intensity of the light occurs, it is indicated by the needle. The exact effect produced by the light rays does not as yet appear very clear, but their presence distinctly produces electrical action, and their absence suspends it.—*Engineering.*

TO READERS.

ALREADY an overwhelming balance of letters in favour of the proposed change of size from twenty-four pages to thirty-two, and of price from 2d. to 3d., shows that not only will the change be cheerfully agreed to, but that it has long been desired. A large proportion of those who have thus written note as the chief (they are good enough to say the only) fault of Knowledge that the articles are too short or broken up too much. About one in twenty-five express doubt whether we may not have among our readers many to whom the increase of price may be displeasing, though as yet, among all who have written, only one has actually said that he will have to cease subscribing if the change is made. Small though I believe the section of our readers to be who will thus view the change, it is a section to which great consideration is due. I may even say that the chief purpose I had in view in planning Knowledge (I hear some cynic say, "Oh bosh! we know what that purpose was"; but even if the implications were just it would not affect my reference to the chief want which I intended Knowledge to meet) was to bring simple yet accurate and attractive accounts of the progress of Knowledge before a section of the reading public including many to whom lowness of price might be an object. But it has become clear from the correspondence which has reached me that the proportion of our present readers likely to care in this sense for the change of price is far too small to justify me in disregarding on their account the emphatically expressed wish of the great majority.

In three among the relatively few letters deprecating change,—comparisons are made between the quantity of matter provided in Knowledge, and that given in other weekly journals like it in being low-priced. I may venture to remark, though it is obvious that few among our readers make a similar mistake, that it is really absurd to compare Knowledge—for example—with such papers as *Chambers's Journal*, *All the Year Round*, and *Cassell's Magazine*. These excellent weekly papers have an enormous circulation—which they owe chiefly to what may be called narrative matter. Knowledge most certainly has nothing to complain of in the matter of circulation. I believe I am within the truth in saying that its circulation is at least thrice as great as that of any weekly of the same character. But until we introduce the narrative element ("in such a 'then' I write a 'never'") we cannot hope to count our readers by the hundred thousand, nor therefore pretend to fill the same space for the same money as the capital serials I have named.

On the other hand, there is a weekly paper of an entirely different kind—the *English Mechanic*—which some few seem to think akin to Knowledge, and cheaper. But there is not the remotest resemblance between the purpose of that useful paper and our own. I speak very confidently and strongly on this point; because I am myself responsible for the completeness of the dissimilarity. At the beginning of the career of Knowledge it was pointed out to me that however different our plan and scope there were certain features in which Knowledge resembled the *English Mechanic*. Those features I immediately altered. I think it wrong and unfair to try to step in between a useful and successful worker and his work—to note how another has achieved a well-deserved success, and to say, "Now will I come in and reap where I have not sown." Knowing that the *English Mechanic* was catering well and successfully for its readers, and doing admirably the work it was started to do, I would not allow even the semblance of similarity

between the two papers to remain. How entirely distinct they now are is shown in this, that except in the correspondence columns (which occupy a much larger space there than here) there is scarcely a single paper or article in the *English Mechanic* which would not be (and be felt at once to be) entirely out of place in KNOWLEDGE. As regards cheapness ("caparisons are odorous," as Mrs. Malaprop did *not* say), I may put the case thus, One paper gives more matter for its price, the other pays better price for its matter. Each strives to the best of its ability to do its proper work, and there neither ought to be, nor is, the least rivalry between them.

One writer, and one only, calmly assumes that the relatively small number of advertisements in KNOWLEDGE when as yet the paper was young, involved a sort of promise that we would never insert more! But, as I said, those who have written are nearly all (certainly more than 20 to 1) in favour of the proposed change,—and even the few who seem against it are most kindly, courteous, and reasonable in their suggestions.

I think the change in KNOWLEDGE had best begin with the first number in March. Before then I will point out how we propose to make use of the larger space made available to us. I shall ask all the kindly readers of KNOWLEDGE to help during the next few weeks in preventing (by getting new subscribers if they can) our constituency from being in any large degree reduced while the change is in progress.

I may take this opportunity of thanking readers for their kindly interest in my health. It will be inferred from the date at which I resumed work that I felt more quickly the beneficial effect of rest than I had expected. I may say I am now for the first time *myself* since the railway accident of last July, a jarred sensation at the back of the head and neck having been an almost constant accompaniment of my travelling and working hours (it almost disappeared when I rested for a few weeks last autumn) until the lecture trip commenced this week. Not a trace of it seems now to remain,—and I think I may fairly say in response to kind inquiries "Richard 's himself again."

RICHARD A. PROCTOR.

THE death is announced of Mr. Julius Pintsch, of Fuerstenvalde and Berlin, the originator and successful patentee of the now widely-used system of lighting railway carriages and floating buoys by means of compressed air. He was widely known in Germany as a successful gas engineer. Mr. Pintsch was seventy years of age.

THE SECRET OF THE NORTH POLE.—The greater part of the earth's surface has been explored more or less thoroughly by our inquisitive race. We know the length and the breadth of our domain, even of those parts which we have never yet been able to reach. Here and there are regions of greater or less extent, which no traveller has yet crossed. But it is only at the two poles of the earth that spaces exist which it has hitherto seemed hopeless to attempt to penetrate. What lies beyond those icy barriers which have again and again foiled our seamen? The great Antarctic ice-continent, from whose mysterious recesses the tidal waves issue without ceasing, and the yet more perplexing Arctic region, in which those waves come to rest, and whither the great Gulf-stream is perpetually bearing its waters—what do these strange regions conceal within their recesses? Will they never give up their secret, these frozen fortresses?—or will the time come when man shall stand a victor at one or other pole, and solve the questions which now perplex geographers?

THE FACE OF THE SKY.

FROM FEBRUARY 15 TO FEBRUARY 29.

BY F.R.A.S.

THE Sun will be examined whenever visible for the spots and other indications of disturbance now so frequent. The Zodiacal light, too, may now be looked for after sunset. The night sky will be found delineated in Map II. of "The Stars in their Seasons." Minima of Algol (Map I.) will occur at 1h. 53m. a.m. on the 23rd, 10h. 43m. p.m. on the 25th, and 7h. 32m. p.m. on the 28th. Mercury is still very unfavourably placed in the sky, and is a morning star. Venus as an evening star improves in her position for the observer, and is a very conspicuous object just to the south of west after sunset. She is still gibbous in the telescope. Mars is visible all night long, and is in an excellent position for the observer. His path may be gathered from the Zodiacal Map on p. 70.* Jupiter continues to be admirably placed in every respect for observation. His exact position will be found laid down in the Zodiacal map on p. 40. Should the nights prove fine the student will find pleasant occupation in watching the phenomena of Jupiter's satellites. To-night (the 15th) Satellite I. will be occulted at 9h. 9m., and reappear from eclipse at 12h. 5m. 28s. p.m. On the 16th the Transit of Satellite I. will begin at 6h. 29m. p.m.; followed by that of its shadow at 7h. 9m. The egress of the satellite will happen at 8h. 49m., and the shadow pass off at 9h. 28m. Meanwhile, at 9h. 20m., Satellite IV. will be occulted. Satellite I. will reappear from eclipse at 6h. 34m. 13s. p.m. on the 17th. On the 19th Satellite II. will enter on to Jupiter's disc at 8h. 49m. p.m.; its shadow not until 10h. 16m. At 11h. 43m. the satellite will quit the opposite limb of the planet, the shadow not following it until between 1 and 2 o'clock the next morning. The Transit of Satellite III. will begin at 7h. 25m. p.m. on the 20th; that of its shadow at 10h. 25m. The satellite passes off at 10h. 59m; the shadow not until after 2 a.m. on the 21st. On the evening of the 21st Satellite II. reappears from eclipse at 8h. 16m. 9s. On the 22nd an occultation of Satellite I. will happen at 10h. 56m. p.m. On the 23rd Satellite I. will begin to cross Jupiter's face at 8h. 15m. p.m.; as will its shadow at 9h. 3m. The egress of the satellite occurs at 10h. 35m.; that of its shadow at 11h. 23m. p.m. On the 24th Satellite I. will reappear from eclipse at 8h. 29m. 10s. p.m. The transit of Satellite II. will begin at 11h. 10m. on the night of the 26th, and its shadow will follow it 52 minutes after midnight. The egress of both will occur during the early morning of the 27th. On the night of that day (27th) Satellite III. will enter on to the planet's limb at 10h. 52m. On the 28th, Satellite II. will re-appear from eclipse at 10h. 51m. 50s.; and finally, an occultation of Satellite I. will take place 43 minutes after midnight on the 29th. Saturn continues to approach the West, and is best seen as soon after dark as possible. Our description of his position on p. 75 is still applicable: a remark which applies equally to Uranus, which, however, is travelling slowly towards β Virginis. Neptune is very poorly placed for the observer. The moon's age at noon to-day is 18·3 days, and, obviously, 29·3 days at the same hour on the 26th. On the 27th at noon her age will be 0·7 day, and 2·7 days at noon on the 29th. One occultation only will occur between the hours to which these notes are limited, during the next fortnight. It is that of the 4½th magnitude star λ Virginis, of which the reappearance alone will be visible, as the Moon will not have risen on the night of the 16th at the time she covers the star. It may, however, be seen to emerge from behind her dark limb at 15 minutes after midnight, at an angle of 186° from her vertex. The Moon is passing across Virgo to-day and to-morrow, and at 2 a.m. on the 17th enters Libra. Her passage across this constellation occupies until 4 a.m. on the 19th, when she crosses into the narrow northern strip of Scorpio. Over this she travels in about 11 hours, and at 3 o'clock in the afternoon of the same day, leaves it for the southern part of Ophiuchus. She quits Ophiuchus for Sagittarius at 11 a.m. on the 21st. It takes her until 11 p.m. on the 23rd to cross Sagittarius into the north-western corner of Capricornus. She leaves this at 1 p.m. on the 24th to enter Aquarius, her journey across which constellation occupies until 7 a.m. on the 27th, at which hour she passes into Pisces. She is still in that great constellation when our notes terminate.

A BRUSSELS correspondent of the *Times* says it is seriously proposed at Antwerp to bring there during the Universal Exhibition in 1885 the *Great Eastern* as a floating restaurant and hotel.

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* By a slip of the pen the opposition of Mars was erroneously stated on p. 75 to occur "at 11 o'clock to-night" (Feb. 1). This should have been 11 o'clock in the morning of that day.

"Let Knowledge grow from more to more."—Alfred Tennyson.

Only a small proportion of Letters received can possibly be inserted. Correspondents must not be offended, therefore, should their letters not appear.

All Editorial communications should be addressed to the Editor of Knowledge; *all Business communications to the* Publishers, *at the Office, 74, Great Queen-street, W.C.* If this is not attended to delays arise for which the Editor is not responsible.

All Remittances, Cheques, and Post Office Orders should be made payable to Messrs. Wyman & Sons.

The Editor is not responsible for the opinions of correspondents.

No communications are answered by post, even though stamped and directed envelope be enclosed.

MR. RUSKIN ON MODERN STORM CLOUDS.

[1116]—There seems to be a great deal more in a name than people imagine, or the theatre of the London Institution would scarcely have been crowded on Monday evening last to hear Mr. Ruskin lecture on "The Storm Cloud of the Nineteenth Century," that is if the lecture in question is to be taken as a criticism of his merit as a teacher of the public.

A printed report may be likened to a photograph—it reproduces, so to speak, but minus the tint and glow of colouring that may be imparted by gesture and inflexion. Denuded of these possible embellishments, and as sketched in the newspaper reports of the following day, Mr. Ruskin's lecture would appear to have been a very sorry affair indeed. He is reported to have "commented with some scorn on the scientific people's explanation of things, and on the inaccuracy of scientific people's terms." Scientific people are supposed to aim at the most scrupulous exactness and perspicuity in their selection of terms; but these conditions would scarcely recommend themselves to one who could say that he "spoke of a storm-cloud, or rather a plague-cloud, which had never been seen but by living and lately living persons." The inference here is that clouds other than this particular cloud may be seen over and over again. If one cloud may be seen over and over again, by what process of reasoning does Mr. Ruskin conclude that his particular cloud was *never* seen before?

Then, again, he saw a wind at Matlock in 1871, about which he is anxious to know a great deal, and goes on to say, "Scientific men could tell by this time all about the moon and the seven stars." (Why seven stars? Possibly he means the other seven planets of our system, but perhaps "planets" is one of the "terms" to which he objects), how they move, and what they are made of. He did not care a copper spangle how they move, or what they are made of, but he would like to know what this wind is whose "sound was a hiss, *or a whistling as on a flute made of a file.*" Then follows a little of Mr. Ruskin's word-painting for which he is so celebrated. This wind produced gloom. "The gloom was Manchester devil's darkness, sulphurous chimney-pot vomit." What *would be* the vomit of a "sulphurous chimney-pot"? Then because he wants to know all about this wind, Mr. Ruskin proceeds to complain that "an anemometer would give no information except as to the strength of the wind, and this shows the silliness of observing the *sky* with machines instead of with eyes," as if an anemometer could do more than indicate the strength of the wind. "If they wished to see how the sun looked through a plague cloud, let them throw a *bad* half-crown into a basin of soap and water." It is not very clear what all this means; possibly it is a protest against fogs (?); at any rate Mr. Ruskin's audience must have left the London Institution in a state of utter bewilderment as to what the lecture was about, or the *Daily News'* report, from which I have quoted, is the grossest piece of bungling that has appeared in print for some time. A. McD.

RED GLARE.

[1117]—In the many accounts of the brilliant sunsets and sunrises of the past few weeks I have not seen any reference made to the sky being of a ruddy colour at any other part of the day, and as I have noticed the red glow on two occasions when the sun was well above the horizon, it may be worth while to describe it. The first experience we had here of the brilliant sunsets was on the evening of Sunday, Nov. 25. On the same day, between eleven and twelve o'clock in the morning, I was watching the passage of a very low, black cloud across the sky, and when it had passed away I saw higher patches of rather jagged cumulus (cirro-cumulus). Behind one of these the sun was hidden, and surrounding it the sky was of a deep red colour (my wife called it "crushed strawberry"). The cloud moved but slowly, and the colour remained for a long time, until, in fact, that part of the sky became entirely overcast with low cumulus, and I did not again observe it. The same occurred on Tuesday, Dec. 18, at two o'clock, the sun again being hidden behind a patch of cirro-cumulus cloud, the sky surrounding which was of a deep red colour. On Nov. 25 the barometer was very low, the reading at nine a.m. being 28·82, while on Dec. 18 it read 30·40.

The light-green colour of the moon was also noticed here on December 3 and 4, and I was so struck with its appearance that I asked my assistant to look at the moon, and he also remarked upon its green colour. On Thursday (December 20), we had a remarkably brilliant sunset, the sky above a bank of cloud, which was passing slowly along the horizon from N.W., being first of a dark purple colour, and then vivid red. This produced a very beautiful effect on the road I was walking along, in a south-south-westerly direction, with the red sky in front of me. Rain was falling slightly, and had been all day, and the wet asphalted road appeared of a rich purple colour, while all the lights in the gas-lamps were green (not the usual colour of our gas). This was from half-past four to five o'clock. E. Howarth.

Sheffield, *Dec.* 22, 1883.

TAME UNCONFINED ROBINS.

[1118]—I have two beautiful red-breasted robins, named Bobby the First and Bobby the Second. They were hatched last spring in a garden which is separated from mine by a high hedge. During the winter and spring their father used to fly into my kitchen, a distance of about a hundred yards from his nest, to get food for himself and family. I always kept a good supply of crumbs and minced meat on a side-table, so that he could help himself, and I noticed that when he had little ones to feed he carried away five pieces each time, from which I knew that he had five mouths to fill.

As soon as his boys were able to travel, he brought two of them, by short stages, to me one day in the garden; he took crumbs out of my hand and fed them, and after saying something to them, which I am sorry I could not understand, he flew off and left them with me for a long time. He did the same every day until they were able to pick up, and then they came alone, whenever they saw me in the garden, and followed me about as long as I remained out.

Not wishing to disappoint the "Dear little Dots," I made a point of going out at stated hours every day to feed them, viz., at seven, nine, and twelve o'clock in the morning, and at three and five in the afternoon, and at sunset. During the whole summer and autumn they came punctually at the above-mentioned hours, never missing a time, nor coming ten minutes too soon or ten minutes too late. What I consider most remarkable is their knowing the time so accurately. I used to look at my watch, and I knew my little birdies would be waiting at the time I had taught them to come. If I went ten minutes before the time they were not there, and did not come when called.

On account of the dark mornings and evenings and the cold weather, I have not been able keep to the regular routine during the past two months; still, during the day I keep my little favourites as much as possible to their former habits. I simply go into the garden and say "Bobbie! Bobbie!" and at once Bobbie the First flies from a tree or shrub on to my knee, and sits and eats biscuit crumbs, sometimes, at my request, giving me a song while there, and Bobbie the Second flies from the hedge to my left side and picks up biscuit-crumbs off the skirt of my dress. They sometimes indulge in a little fight while being fed, when I part them with my hand, and they return to their places and finish their meal. They are the most friendly, brave, tractable robins I have ever seen.

A. Jarvis.

THE CRIBBAGE PROBLEM, BY H. H. H., p. 60.

E. C. H. makes 74, by the following arrangement:—Opponent 6, 6, 4, 4 (in order of play) dealer 6, 6, 4, 4; trump, 5; crib, knave (of trumps), 5, 5, 5.—J. A. Miles makes 61, or game in one hand, opponent making only 5; thus, Opponent 10, 6, kn., 8 in order of play; dealer, 5, 5, 5, kn. of trumps; trumps, 5; Crib, 4, 4, 6, 6.—J. H. H. makes 70; opponent 3, 3, 4, 4; dealer 3, 3, 4, 4; trumps, 5; crib the four knaves.—H. Tinden's first incomplete solution unfortunately misplaced; crib sent separately later.—C. F. Dunlee cites as occurring in an actual game, 29 made in play.—J. E. Willis makes 61 with 3 only to opponent (!) thus, opponent knave, 5, knave, 9; dealer 5, 5, 5, knave (trumps); trumps, 2; crib 9, 9, 10, 10.—

T. F. W. H. makes 73; opponent, 6, 6, 4, 4; dealer 6, 6, 4, 4; trumps, 5; crib, 5, 5, 5; knave (trumps).—E. C. H. later makes 75, thus: Opponent, 6, 6, 8, 4; dealer 6, 6, 4, 4; trumps, 5; crib knave of trumps, 5, 5, 5.—F. M. DUPLOCK and A. B. tie for first place by making 78, thus:—Opponent, 4, 4, 3, 3; dealer 4, 4, 3, 3; trumps, 5; crib, knave of trumps, 5, 5, 5. Can this be beaten?

LETTERS RECEIVED.

E. H. STRITTER.—H. J. M.—J. E.—E. W. P.—G. J. W.—F. P.—L. J. E. H.—C. H. J.—C. P. K.—G. C. G.—W. M. WALKER.—E. C. GEACH and H. P. B. RIGBY. Mr. Proctor's opinion has been given in KNOWLEDGE.—J. W. STANIFORTH.—A. McD.—C. P. KEMBALL and R. M. FULLER. Mr. Proctor's lectures are not published.—E. MUNROE.—W. WHITAKER.—A. C. BRUCE.—R. H. BATCHELOR.—AN AMATEUR. I think 1878. What opposition of Mars do you mean?—A. E. F. Think I remember such an article by W. Cave Thomas. Cannot tell; am away from India.—J. WHITELAW.—CURMUDGEON. The editor might, if disposed to be as keen as you, say you *have* sent your true name. As a matter of fact, he merely notes that it is better, not necessary; and it is not usual when a correspondent has something specially disagreeable to say.—C. MOON. Thanks for kindly letter, and the hearty laugh your closing story gave me.—C. CARRIE WILSON. A flat disc, arctic pole at centre, antarctic ice at circumference.—W. T. H.—C. PEARSON.—H. B. HEATH.—L. C. W.—H. RITCHIE.—J. J. C. VALPY.—E. Y.—L. A. E. You ask a little too much.—C. E. FLETCHER.—J. O. LINDSAY.—T. DUPLOCK.—C. H. JOHNS. Thanks; but the action would be too slow. The aërial comets known to exist would do the work efficiently.—W. FITZGERALD. Thanks for much better than Whistlerian sketch. But that could not have been Pons' comet. Yet not a Pons' asinorum as you pathetically suggest. Have not yet seen any reference to Zechariah's prophecy, "At evening time it shall be light."—D. C. My good sir, you are somewhat *too* cool. When KNOWLEDGE was first started, we were "living on hope"—the hope that advertisements would grow, as in fact they have grown. Till they so grew we had perforce to fill twenty pages out of twenty-four—much oftener than we liked—with what you call "readable matter." "Some time ago" you "had pen in hand to protest against the increase of advertisements,"—well as a matter of fact you had pen in hand ("all unbeknown") to protest against the existence of KNOWLEDGE. Thanks so much.—T. B. SMITH. Why ask me to explain all that when you go on to show you know so much more about it than I do, or than any one living knows?—M. POOLE. Why not write a book or take the last answer; and let T. B. S. take this.—J. CLAYTON. Why that's Newton's first law. See Newton's "Principia" thereon. You find the best proof in the planetary movements. Mr. Newton Crosland thinks (I fancy) the law is wrong; for he asks somewhere what keeps the velocities up? But then Newton C. is not Newton. See!—JAS. ELLIS. Ah, but you see my friend happens to be a gallant and chivalrous gentleman who speaks from knowledge as well as in KNOWLEDGE. So many of my own best friends and kinsfolk are of Irish blood, that the idea of defending as *Irish* those whom he has roundly denounced seems to me offensive in the extreme. One might as reasonably defend the inmates of Newgate as *English*.

SUB-EDITORIAL.

CONSTANT SUBSCRIBER.—JOHN HALL. The eye-piece of a telescope *is* a microscope.—F. R. C.—P. H. FARADY.—R. W. BROWNE. Thanks for very kind letter.—AND. AITKEN. M.S. on subject completed.—J. EDWARDS.—T. M. D.—H. I.—R. IRVINE.—JOHN PEERS.—S. M. B.—EYE-WITNESS. You surely cannot see any parallelism between the paper you name and KNOWLEDGE; the two papers are intended for readers of entirely different classes. Supposing we started a series of papers on "The Organ: its Procural and Lodgment;" on "Plumbing in all its Departments;" on "The Screw-driver: its Development and Employment," we might fill the space you mention at no cost at all, or even be paid for allowing pictures to appear in illustration of valuable patents. That is quite outside our plan and purpose; and however suitable, even desirable, in its proper place, would be a gross wrong to readers whom our promises entitle to expect something very different. For editing, one number of KNOWLEDGE costs more than five numbers of the other paper.—LONGWORTH.—JUPITER.—W. GRANDY.—LUCRETIUS. Do not know.—J. N. KIRBY. Thanks.—J. A. GEE. Many thanks. It seems to me a series of harmonographic curves, systematically arranged, with short but sufficient explanation, would be very interesting. To serve as copy the curves should be in black ink.—O. ROHDE.—AN OLD SUBSCRIBER.—S.—TOM FRED. I should say,—the boys in smaller room with the window open at top.—W. H. T.—G. G. G.—E. ANDERSON.—W. H. M.—W. J. F.—ACCUMULATIONS.—G. W. H. G.—S. STEWART.—C. W. B.—W. H. B.—J. MATTHEWS. Knowing by effects that there is a cause, is very different from knowing what that cause is. Persistent force shows there is a First Cause, but the nature of that cause remains "Unknown, yea ever more Unknowable."—A. McD.—C. SMITH.—W. H. P.—D. C. Thanks.—T. J. O'CONNOR. The value of The New Principles of Natural Philosophy may be summed up in one word—"Bosh!"—H. A. B. Very little is known about the origin of the Zodiacal signs, or the time when they were first used. Mr. Kinn's views are scarcely worth considering; he offered us a paper, expressing what he has since more fully embodied in a book: but his reasoning was so utterly futile that we declined-with-thanks.

Our Whist Column.

BY "FIVE OF CLUBS."

PROBLEMS, p. 62.

Simple Ending No. 1.

Y's cards. *C K*; H Kn; S Kn, 2; D 9.	*B*'s cards. *C A*, 5; S 4; D 4, 2.
A's cards. H A, 10; S 10; D Kn, 7.	*Z*'s cards. H K, 5; S 6; D 10, 5.

Clubs trumps; *A* to lead; *A B* to make all five tricks.

Simple Ending No. 2.

Y's cards. *C* 10, 7; H A, Kn; S Q, 10, 2.	*B*'s cards. H K, 7, 4; S K, 9; D A, Q.
A's cards. *C A*, Kn; H 6; S 4; D 10, 9, 8.	*Z*'s cards. *C* 9, 6; H 9, 8; S 8, 7, 6.

Clubs trumps; *A* to lead; *A B* to make all seven tricks.

Simple ending No. 1 is correctly solved by VAENOL, Q. T. V., Hiero, J. M., C. E. Bell, Ruff, H. J. Ph., Old Westminster, Cousin Jack, M. Hartington, and J. Scantling. The second, and slightly more difficult problem, by VAENOL, J. M., C. E. Bell, Ruff, H. J. Ph., and Old Westminster. The solutions are as follows:—

1st Ending.—*A* leads Ace Heart, *B* discarding Spade Four; *A* leads Spade Ten; *B* trumps if necessary (the play being simplified if he has not to), leads winning trump, and the remainder of the hand plays itself according to the discards.

2nd Ending.—*A* clears out trumps, *B* discarding his Diamonds; *A* continues with his long Diamonds, and *B* wins the remaining tricks, his play varying according to the discards, but being obvious in every case.

H. DENNYS.—It is not very unusual to see *Slam*, or all the tricks won by one side. It would be rather difficult to determine even roughly the odds against the occurrence. We should say it happens about as often as a Yarborough hand,—that is, a hand with no card above a nine.

H. LEWIS.—Many thanks; but you rather misunderstood our note.—On trick 11 (p. 91), we note "*Z* luckily holds the minor tenace in Clubs," and (12, 13) "makes the last two tricks and *Y-Z* win." It was so clear that holding the minor tenace *Z* could not possibly win two tricks against the major tenace guarded, that we did not think it necessary to dwell on *B*'s generosity in giving *Y-Z* the game by leading the Queen. We were rather cramped for space, or the note would have dwelt on the badness of *B*'s play as well as on *Y-Z*'s good fortune. For a similar reason (and because *Y*'s play more concerned us) we did not dwell on *B*'s bad play at trick 9, in leading Club Ace, when it has become practically certain that *Y* has not the Club 10, and that *A* has the Club K. Our note on trick 11 might have run, "*Z* holds the minor tenace in Clubs, and as *Z* is good enough to make it the major tenace by leading the King card in that suit, *Z* makes the last two tricks and *A-B* win."

A. C. M.—So long since I played "long Whist" that I forget the rules about "Can you one, partner?" My impression is that the question could not be asked until the first trick has been completed. If playing first card stopped the question, leader might by hurrying deprive the opponents of their right before either knew whether he had two honours or not. By the way what a ridiculous law it was, any way. As to the other question there is no doubt: honours can be counted if claimed, or even asked about before the trump card is turned.

COVENTRY.—No player of any repute known to me leads (as a rule) Ace, from Ace, King, three or more. The argument that partner if he has but two trumps might be tempted to ruff is invalid. For even if partner *knew* that the Ace lay on his left, he would as a rule do ill to ruff. Defend us from a partner who systematically blocks our long suit by ruffing. He makes his wretched little trump, which probably he could have made just as easily in the same suit, later on; and when a chance for bringing in the long suit comes, the enemy with his King card nips the suit in the bud.

Our Chess Column.

By Mephisto.

KING'S GAMBIT.

(*Continued from p.* 78.)

1.	P to K4 / P to K4	2. P to KB4 / P takes P	3. Kt to KB3 / P to KKt4
4.	B to B4 / B to Kt2		

We will now examine the continuation of 5. P to KR4, Black's best reply is 5. P to KR3, *i.e.*—

	P to KR4 / P to KR3		
	P to Q4 / P to Q3		
7.	Q to Q3 / Kt to QB3		Kt to B3 / P to QB3
8.	P takes P / P takes P		P takes P / P takes P
9.	R takes R / B takes R		R takes R / B takes R
10.	P to K5 / B to Kt2, or	P to Q4	Kt to K5 / P takes Kt
11.	Kt to B3 / Kt to R3	Q to R7 / K to B sq.	Q to R5 / Q to B3
12.	P takes P / P takes P	Q takes B / P takes B	P takes P / Q to Kt2
13.	Kt to Q5 / K to B sq.	P to B3 / B to Kt5	P to K6 / Kt to B3
14.	Kt takes KtP / Q takes Kt	QKt to Q2 / Q to Q5	P takes P (ch) / K to K2
15.	B takes P / Q to R5 (ch)	Q to R sq. / B takes Kt	Q to K2 / B to Kt5
16.	P to Kt3 / Q to R8 (ch)	P takes B / R to K sq.	Q to Q3 / QKt to Q2

In all these variations Black maintains his advantage. It will be seen that the chief attack is gained by either attempting to play the Q to R7 *vid* Q3, or to play Q to R4 after exchange of Rooks; this has to be guarded against. Black may also play K to B sq., followed on Queen playing to R7 by B to Kt2. Another variation of the same attack is—if White on his seventh move plays P takes P, *i.e.*—

7.	P takes P / P takes P	8. R takes R / B takes R	9. Q to Q3 / Kt to KR3
10.	P to KKt3 / Q to K2	11. Kt to B3 / P to QB3	12. P takes P / P to Kt5
13.	Kt to KKt5 / Kt to Q2	14. P to K5 / Kt to B3	15. B to K3 / P to Q4
16.	B to Kt3 / Kt to B4	17. Castles / Kt to Kt sq.	

Should Black on his fifth move play P to Kt5, White would reply as follows:—

5.	P to KR4 / P to Kt5	6. Kt to Kt5 / Kt to KR3	7. P to Q4 / P to KB3

With proper play White ought always to get a good game from this sacrifice. The position can be brought about in various ways, as for example, by

1.	P to K4 / P to K4	2. P to KB4 / P takes P	3. Kt to KB3 / P to KKt4
4.	P to KR4 / P to Kt5	5. Kt to Kt5 / Kt to R3	6. B to B4 / B to Kt2
7.	P to Q4 / P to KB3		

and we have the same position which will, as aforesaid, occur also in various other ways. White will continue with 8. B takes P / P takes Kt 9. B takes KtP (P takes P, followed by Q to Q2, likewise yield a strong attack) 9. B to B3 10. B takes Kt / B takes P (ch) 11. K to Q2 / B to Kt4 (ch) 12. K to Q3 with no disadvantage.

ANSWERS TO CORRESPONDENTS.

*** *Please address Chess Editor.*

H. S. L.—End game received with thanks.

M. D. Dimond.—Experience has proved that in a tournament with a small number of players it is best for every man to play one game with every other competitor, draws to count half to each player. You must beforehand draw every member against each other, to ensure regular play. If you find this task too much, you will find an excellent method for pairing all players beforehand indicated in No. 70 of Knowledge.

E. Anderson.—"Positions in the Chess Openings," by Long, is an excellent book for beginners.

Old Romney, W., M. T. Hooton.—Solutions correct.

Contents of No. 119.

	Page
Gambling Superstitions. By R. A. Proctor	79
Our Earth's Dust Envelope. By Prof. S. P. Langley	80
Mr. Ruskin on a New Storm-cloud	81
The Chemistry of Cookery. XXVIII. By W. Mattieu Williams	81
Pleasant Hours with the Microscope. (*Illus.*) By H. J. Slack	82
The American Encyclopædia	84
Song and Speech	85
Drawing the Planets. (*Illus.*) By F.R.A.S.	85
The Day Sign for February	87
Mr. Spencer and the *Edinburgh Review*	88
Correspondence: The Fellowship of the Learned Societies.—Extraordinarily Low Barometer, &c.	88
Our Whist Column	91
Our Chess Column	92

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The following arrangements are complete: the numbers in brackets referring to above list.

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GLOUCESTER (Corn Exchange), Feb. 20, 21, 27, 28 (1, 2, 3, 4).

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HITCHIN, March 20 (5).

UXBRIDGE, March 21 (1).

LONDON (Brixton Hall) March 28, April 1, 4 (1, 2, 3).

" (Memorial Hall), March 24, 27, 31, April 3 (1, 2, 3, 4).

Note.—*All communications respecting Lectures should be addressed to Mr. John Stuart, Royal Concert Hall, St. Leonards.*